REMARKS

Claims 1-111 are pending after entry of this paper. Claims 2-4, 6-65, and 80-83 have been rejected. Claim 1 has been allowed. Claims 5, 66, and 109 have been objected. Claims 67-79, 84-108, and 110-111 have been withdrawn. Applicants reserve the right to pursue withdrawn claims in a divisional or continuing application.

Reconsideration and withdrawal of the pending rejections in view of the below remarks are respectfully requested.

Response to Rejections under 35 U.S.C. §103

Claims 2-4,6-65 and 80-83 have been rejected under 35 U.S.C. §103(a) as being unpatentable over USPN: 4,661,289 to Parslow et al. in view of Janeckova et al. (*Ceska Mykologie*, (1977) Vol. 31, No. 4, pp. 206-213 (Abstract)). Applicants respectfully traverse the rejection. Specifically, the Examiner states that Parslow teaches compositions comprising fungal cellulase, surfactants, cationic fabric-softening compounds and builders that are useful for cleaning and softening natural and synthetic fibers. However, the Examiner admits that Parslow does not teach the claimed composition (Office Action, page 4). Janeckova is combined for disclosing the isolation of the fungus *Chrysosporium lucknowense* from soil. The Examiner further makes reference of record to Bukhtojarov for evidence that *Chrysosporium lucknowense* contains "cellulolytic enzymes including endoglucanases, cellobiohydrolases, and cellulases that have neutral and/or alkaline cellulose [sic] activity" (Bukhtojarov et al. *Biochemistry (Mosc)*. 2004 May, 69(5):542-51; Abstract). Applicants respectfully disagree and maintain that the non-obviousness of the rejected claims is made evident by the teaching away of the prior art,

unexpected results obtained by the claimed invention, the lack of success by others, and the commercial success of the instant subject matter.

1. Prior Art Teaches Away

Parslow et al. has been combined with Janeckova et al. for allegedly making obvious the instant claims. As an initial matter, applicants assert that the cited references are described individually as the Office Action similarly does. However, contrary to the Office Action, applicants conclude that the combination of references does not make obvious the claimed invention. Applicants are not "attacking the references individually where the rejections are based on combinations of references" (Office Action p. 5).

Applicants again assert that Janeckova merely reports the existence of *Chrysosporium lucknowense* as isolated from soil samples. There is no further description or characterization of any of the listed species except to indicate that the soil samples were collected from the Himalayas.

Prior to the filing of the instant application, it was believed that all fungal cellulases were acidic by nature. However, the applicants surprisingly discovered that *Chrysosoprium* cellulase has neutral and/or alkaline activity, which is completely unexpected for a fungal cellulase and prior to applicants' discovery, was undetected. Once again, applicants respectfully direct the Examiner's attention to Horikoshi which states that "...cellulases originating from animals and fungi, have optimum pH of from 5.0 to 6.0, and cellulases originating from bacteria belonging to the genus Pseudomonas or the like have optimum pH approximately 7.0." (USPN: 3,844,890; col. 1, lines 11-15). In view of the `890 patent, one of ordinary skill in the art could only assume that a *Chrysosporium* cellulase would behave similarly to the typical fungal cellulase, i.e., having an optimum pH of 5.0 to 6.0, and would have

little activity above a pH of about 7.0, as shown for the *Aspergillus*, *Trichoderma*, and *Penicillium* cellulases in the graph of Figure 4 (reproduced below for the Examiner's convenience). The skilled artisan would expect *Chrysosporium* to have the pH activity profile of other fungal cellulases, namely *Aspergillus niger*, *Trichoderma sp.*, or *Penicillium sp.* The pH profile of the bacterial cellulase, *Pseudomonas sp.* would not be expected to reflect a fungal cellulase pH profile. However, contrary to convention, applicants data demonstrate that the pH optimum for *Chrysosporium* cellulase activity is about 6.5 (See, p. 32, Table 7) and maintains similarly high activity above pH 7.

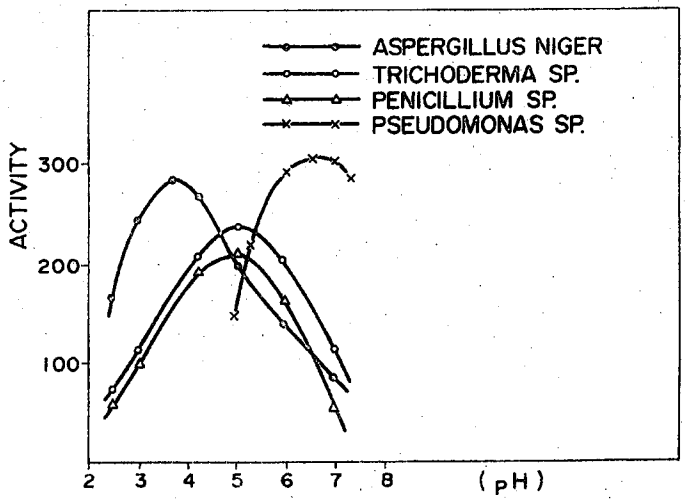

FIG. 4

Janeckova does not disclose the contrary, and hence, the pH-activity profile of the *Chrysosporium* cellulase that applicants present is entirely unexpected for fungal cellulases. In fact, having read Janeckova, the skilled artisan could only conclude that *Chrysosporium* is the same as any other fungi and in particular, any of the ones specifically isolated from the soil, such as for example, *Aspergillus*, *Penicillium*, and *Trichoderma*, ssuming arguendo that one skilled in the art would have known and understood that cellulases could be derived from *Chrysosporium*, since Janeckova does not characterize or describe the fungi as such. Additionally, Parslow does

not even disclose *Chrysosporium* cellulase and is therefore silent as to how *Chrysosporium* behaves. Thus, based on what was known in the art, Janeckova's silence as to the described cellulases, and the fact that fungal cellulases were known to be acidic fungal cellulases that behave similarly to the pH profile presented in the `890 patent, substituting a cellulase derived from the *Chrysosporium lucknowense* (or any of the other 36 fungal species identified) isolated from soil by Janeckova for use in the Parslow composition comprising a fungal cellulase having alkaline activity could not and would not even have been contemplated. Parslow teaches away from using any of Janeckova's identified and isolated "acidic" fungi for the alkaline fungal cellulase of Parslow.

Contrary to the Examiner's contention, the skilled artisan would not have been able to simply substitute the fungal cellulase of Parslow with a cellulase derived from one of the possible fourteen genera having 37 species disclosed in Janeckova. Parslow specifically mentions that *Humicola insolens*, *Bacillus*, or *Aeromonas*, none of which were isolated by Janeckova, produce alkaline cellulases. Keeping in mind that the `890 patent discloses what was commonly known and understood in the art at the time the instant application was filed, *i.e.*, that fungal cellulases have maximal activity at an acidic pH, Parslow does not provide any evidence to the contrary of the common understanding that *Chrysosporium* cellulases have acidic cellulase activity. Therefore, one skilled in the art would not have even contemplated or tried to substitute the claimed *Chrysosporium* cellulase in place of one of the alkaline cellulases described in Parslow, i.e., *Humicola*, *Bacillus*, or *Aeormonas*. Applicants assert that it would not have even been obvious for the skilled artisan to try to substitute one of the possible 37 species of fungi with the Parslow fungi having alkaline cellulase activity since Parslow teaches away from using fungal cellulases NOT having optimum activity at alkaline pH values.

In view of what was known at the time the application was filed and the teaching away of the cited art, the skilled artisan could not simply substitute an alkaline cellulase produced by *Humicola insolens* or *Aeromonas* with a *Chrysosporium lucknowense* fungi isolated from soil samples. The Examiner alleges that the skilled artisan would have known to a) take the *Chrysosporium* fungi as described in the 1977 Janeckova abstract; and b) in view of the 2004 post-filing art, i.e., Bukhtojarov, which isolates and characterizes enzymes from *Chrysosporium lucknowense*, isolate therefrom a cellulase that was wholly known at the time the instant priority application was filed, i.e., 1996, to be an acidic fungal cellulase, in order to result in the claimed composition having neutral and/or alkaline cellulase activity obtained by growing a wild type or mutant *Chrysosporium* fungus in a suitable medium and isolating a cellulase having neutral and/or alkaline activity from the fungus.

Applicants respectfully submit that the evidence clearly supports a conclusion that neutral and/or alkaline compositions, which comprise a *Chrysosporium* cellulase, are not obvious in view of the prior art. Moreover, *Chrysosporium* cellulases are not obvious components of such alkali-tolerant compositions. For the same reasons as above, and in particular, in view of the teachings of the prior art, one of ordinary skill would expect *Chrysosporium* cellulases to be typical acid cellulases. Also, the skilled artisan would not expect *Chrysosporium* cellulases to retain activity across the industrially useful pH range of 5.5 to 8.0. The performance of a *Chrysosporium* cellulase across this pH range, which is characteristic of neutral/alkaline cellulases, is unexpected and therefore not obvious to one of ordinary skill.

In summary, applicants respectfully submit that the evidence clearly supports a conclusion that a neutral or alkaline composition comprising a *Chrysosporium* cellulase is not obvious in view of the cited prior art that teaches away from using acidic fungal cellulases.

2. Unexpected Results

The claimed cellulase compositions have optimal activity over a range of neutral and alkaline pH values. The unique properties of the neutral and/or alkaline cellulases are evident. The superior performance of the neutral and/or alkaline cellulases is disclosed in the instant specification (Table 13, pp 38-39; Table 14, p. 42). One of ordinary skill in the art would expect, in view of all of the prior art and what was commonly known and understood in the art, that a fungal cellulase such as *Chrysosporium* cellulase, would perform in the same manner as any of the other typical fungal acidic cellulases, and would most certainly not expect to obtain the superior performance of a neutral and/or alkaline cellulase as demonstrated by the commercial success (see, attached Declaration of Mark A. Emalfarb).

In summary, in view of the art and the understanding of fungal cellulases at the time the application was filed, the superior performance of a Chrysosporium cellulase having neutral and/or alkaline activity was greatly unexpected and therefore not obvious to one of ordinary skill.

3. Secondary Considerations: Long-felt need and Lack of Success by Others

Even though neutral and/or alkaline cellulases were known in the art, there have been few newly identified or reported neutral and/or alkaline cellulases since U.S. Patent No. 4,435,307 to Barbesgaard which states that "the art has not identified, heretofore, any cheap cellulase which exhibits an acceptably high cellulase activity at the pH-values normally prevailing in main wash solutions in spite of the fact that a tremendous commercial advantage might be achieved if this need for such a cellulase is fulfilled." (Col. 2, lns. 14-19) Barbesgaard discloses a *Humicola insolens* cellulase marketed under the trade name "Denimax T."

Subsequently during the sixteen years thereafter and up until the instant application priority filing, there have been only a select few identified cellulases, such as those derived from *Trichoderma longibrachiatum*, *Bacillus*, and *Cellulosmonas*. However, applicants unpredictably discovered that *Chrysosporium* has neutral and/or alkaline cellulase activity with surprisingly superior effects. It is believed that between Barbesgaard's patent filing in 1981 and the present application priority filing in 1996, only one additional neutral and/ or alkaline cellulase was successfully marketed.

In summary, industrially useful neutral and/or alkaline activity is not inherent to fungal cellulases as a class, and is in fact extremely rare. Thus, one would not have had any motivation to even try to substitute the *Humicola insolens* of Parslow with a *Chrysosporium* cellulase in a composition having neutral and/or alkaline activity. Despite the efforts of many investigators, there was only one source of a commercially successful neutral cellulase, i.e., Barbesgaard's *Humicola insolens* prior to the instant invention which represents only the second commercially successful neutral and/or alkaline cellulase.

4. Commercial Success Of Invention

Applicants reproduce herewith a Declaration of Mark Aaron Emalfarb under 37 C.F.R. §1.132 as originally filed in the parent application (USSN: 08/731,170) on April 6, 1998 (see, Exhibit A). Mr. Emalfarb was the Chief Executive Officer and President of CPN International, Ltd., Inc. and the Chief Executive Officer and President of AARL Inc. These companies with Dyadic International, Inc. eventually formed Dyadic International (USA), Inc. of which Mr. Emalfarb is currently Chief Executive Officer. In the Declaration, Mr. Emalfarb's statements suggest that *Chrysosporium* neutral and/or alkaline cellulases were readily accepted by the market. The projected sales for the year following the introduction of the cellulases, as

well as the doubling of the market price per pound clearly demonstrates the high demand and commercial success of the neutral and/or alkaline *Chrysosporium* cellulase. Moreover, substitution of the *Humicola insolens* neutral and/or alkaline cellulase (same as disclosed in Parslow) with the claimed *Chrysosporium* neutral and/or alkaline cellulase resulted in reduced costs and provided "equivalent or superior performance of the products."

The combination of Parslow and Janeckova does not make obvious the claimed invention for the reasons that the prior art, and what was commonly known at the time the application was filed, taught away from the claimed disclosure, the unexpected and surprising results obtained by the applicants, and the long felt need and lack of success by others. Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 2-4, 6-65 and 80-83 in view of the aforementioned remarks.

Dependent Claims

The applicants have not independently addressed all of the rejections of the dependent claims. The applicants submit that for at least similar reasons as to why independent claim(s) 1, 2, 4, 24, 36, 40, 43, 46, 49, 52, 55, 58, 61, 64, and 80 from which all of the dependent claims 2-3, 5-23, 25-35, 37-39, 41-42, 44-45, 47-48, 50-51, 53-54, 56-57, 59-60, 62-63, 65-66, 81-83, and 109 depend are believed allowable as discussed *supra*, the dependent claims are also allowable. The applicants however, reserve the right to address any individual rejections of the dependent claims and present independent bases for allowance for the dependent claims should such be necessary or appropriate.

Thus, applicants respectfully submit that the invention as recited in the claims as presented herein is allowable over the art of record, and respectfully request that the respective rejections be withdrawn.

CONCLUSION

Based on the foregoing amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application. Favorable action by the Examiner is earnestly solicited.

AUTHORIZATION

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **50-2547**, Order No. 3123-4000US2.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **50-2547**, Order No. 3123-4000US2.

Respectfully submitted,
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